DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
POLICY AND PROCEDURES

NUMBER:	WRD-	**DRAFT**
SUBJECT:	PART 353, MEASURING HEIGHTS AND SLOPES OF DUNES	

ISSUE:

Section 35316(4) of Part 353, Sand Dunes Protection and Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), requires the Department of Environment Quality (DEQ) to develop guidelines describing the method to be used when measuring slopes within designated critical dune areas (CDA). The previous procedure had not been updated since 1996.

AUTHORITY:

Part 353 of the NREPA.

DEFINITIONS:

"Clinometer" is a handheld instrument that measures angles and slopes in degrees and percents. This instrument is one of the approved instruments for slope measurement.

"Survey stakes" are standard height stakes usually four feet in height and usually having one-foot markings on the post.

POLICY:

This policy describes how dune slopes are measured to promote consistency in determining the steepness of slopes within designated CDAs. CDAs across the state exhibit a wide range of terrain conditions. Early in the program, the decision was made that height of a dune feature would be one of the criteria used to distinguish between significant and insignificant alterations of dunes. This procedure includes the method used to determine the height of a dune feature.

REFERENCES:

Part 353 of the NREPA.

REFERENCE TO DIVISION PROGRAMS:

Sand Dunes Protection and Management

Division function:

Compliance and Enforcement	Permit Issuance

METHOD OF DISTRIBUTION:

Intranet, Internet, and at Critical Dune Committee meetings.

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PROCEDURE:

Responsibility	**Action**
Critical Dune Program Staff	1. During the site inspection, staff determines whether the dune(s) proposed to be altered by the project is/are over six feet in height throughout the overall feature. Depending on the project, there may be multiple dunes requiring height determination. 2. The lower six feet of a larger dune feature should not be isolated when making the height measurement. Dunes undulate; can rise a few feet, level off, and then rise again. View all sides of the dune to determine whether one side is taller or if the feature is part of a larger dune. The entire dune feature is to be considered in making the height determination. a) If the feature is greater than six feet in height, continue with the site inspection. b) If the dune is six feet or less in height, is isolated, and not attached to a larger feature, the dune would generally be considered "insignificant" and its steepness of slope is not a factor in determining if the feature can be impacted. All sides must be less than six feet in height. Record dune measurements on the PRR, field notes, or cross section supplied with application. 3. **For dune features with a consistent slope:** Place survey stakes at the toe and highest point of the slope being measured, perpendicular to the ground surface. 4. Standing at either the toe or top of the dune being measured, place the clinometer with the site-line aligned with the top of the survey stake. Keeping both eyes open, look through the clinometer simultaneously through and alongside the housing, adjusting the angle of the clinometer until the horizontal sighting line aligns to the top of the survey stake opposite you. Percentage readings are on the right scale. Once the DEQ approves another tool for measurement of slopes, follow the manufactures' directions.

Critical Dune Program Staff (continued)

5. Take the measurement parallel to the ground surface, which will accurately reflect the slope of the dune. In other words, the height of the clinometer above the ground and the height of the point being viewed through the clinometer above the ground must be the same.

6. **If the slope is not consistent from crest to toe**, more than one measurement may need to be taken. Determine where the slope changes; each segment should be measured. If the elevation change of the segment is less than six feet in height and of limited extent, the slope may be considered insignificant and that segment's steepness is not a factor in the evaluation.

7. Record all slope measurements on the site inspection form and/or field notes.

APPROVED: _____ DATE: _____

William Creal, Chief
Water Resources Division